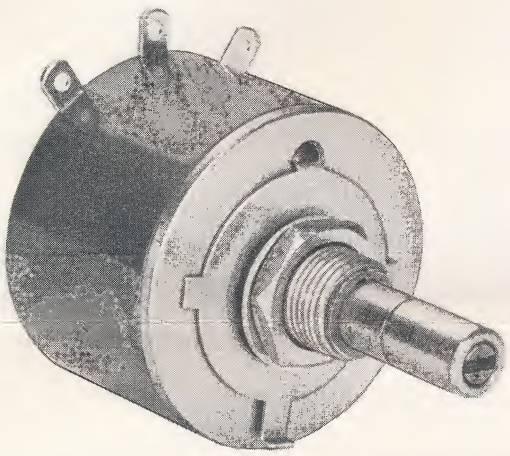
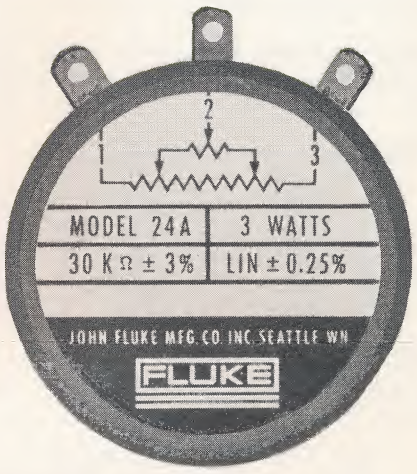
PRELIMINARY

JOHN FLUKE MFG. CO., INC. ■ MODEL 24A

FLUKE

HIGH RESOLUTION VERNIER POTENTIOMETER





FEATURES

- High Resolution
- Speed of Adjustment
- Low Phase Shift
- Low Noise
- Minimum End Resistance
- Small Size
- Low Cost
- Installation Options

APPLICATIONS

- Analog Computers
- Data Logging Systems
- Test Instrumentation
- Trimmer
- Absolute Zero Adjust
- Adjustable Power Supplies
- Signal Conditioning
- Simulation

The unique FLUKE MODEL 24A Potentiometer combines the most wanted feature of linear multi-turn wirewound potentiometers with low cost and small size. The Model 24A is smaller than, and priced below, most single turn precision potentiometers, while providing the military, commercial or industrial user with linearity accuracies and higher resolution than available in 10-turn potentiometers of comparable size and price.

The Model 24A incorporates two potentiometers (coarse and fine) in a single case. In the actual construction a coarse potentiometer (main resistance element) is built around a fine (vernier resistance element) potentiometer. The two units are internally coupled both electrically and mechanically utilizing the "loss motion" principle of controlling relative mechanical and electrical rotation. Actuation of the contact arms is controlled through coaxial shafts. Each shaft may be independently adjusted, thus effecting the positioning of the respective contact arms (within its actual rotational angle) without respect to the other. Control over the entire range of both the main and vernier elements can also be achieved through the use of a single knob mounted on the vernier shaft.

The vernier potentiometer is connected in parallel through two spaced contacts with a portion of the main potentiometer resistance element equal to the resistance value of the vernier element. In standard units this produces a vernier function which is equal to 5% of the total input resistance of the potentiometer. The vernier element may now be placed in parallel with any portion of the main resistance element by moving the two spaced contacts along the main resistance element. At any point the vernier contact arm may be actuated by rotating the vernier shaft thus providing the ability to interpolate or expand any fraction of the main resistance over 270° of shaft rotation. This vernier action over any part of the main potentiometer results in resolution equal to or greater than available in 10-turn helically wound potentiometer in only 555° of shaft rotation.

As the vernier shaft is rotated, causing the vernier contact arm to complete both its mechanical and electrical rotation, a mechanical stop on the vernier shaft engages a stop section molded into the vernier potentiometer case. Continued rotation of the vernier shaft causes the entire vernier potentiometer assembly to rotate about the vernier shaft thus transposing the two spaced contacts along the main resistance element until rotation of the vernier shaft is stopped, reversed or the limit of mechanical and electrical rotation is reached. When the coarse adjustment is accomplished the direction of rotation of the vernier shaft is reversed to make the fine (vernier) adjustment. This reversal of rotation disengages the two related stop members thus permitting the main contact arms to remain stationary while the interpolating adjustment is completed. The same mechanical operation occurs at either end of the vernier potentiometer's rotation, thus providing rapid adjustment over the entire range of the complete potentiometer.

24A SPECIFICATIONS

ELECTRICAL SPECIFICATIONS

RESISTANCE RANGE: Standard values: 100Ω, 200Ω, 250Ω, 500Ω, 1K, 2K, 2.5K, 5K, 10K, 20K, 25K, 30K, 50K, and 100K. Special values available.

RESISTANCE TOLERANCE: ±3% standard. Special tolerances to ±1% available.

LINEARITY, TERMINAL: 1K and above, ±0.25%; 100Ω to 500Ω, ±0.5%. Special linearity accuracies available.

RESOLUTION:

100Ω	.045%	5K	.012%
200Ω	.028	10K	.012
250Ω	.028	20K	.010
500Ω	.026	25K	.009
1K	.017	30K	.009
2K	.014	50K	.008
2.5K	.013	100K	.007

POWER RATING: 3 watts at 25° C derated to 0 at 100° C.

NOISE: Less than 100Ω ENR

END RESISTANCE (both ends):
100Ω - 20K, less than 0.5Ω
25K - 100K, less than 1.0Ω

TEMPERATURE COEFFICIENT: All standard values have a T. C. of less than 50 ppm/° C from 0° C to 100° C for the complete potentiometer. Potentiometers above 100Ω are wound with wire having a T. C. of less than 20 ppm/° C.

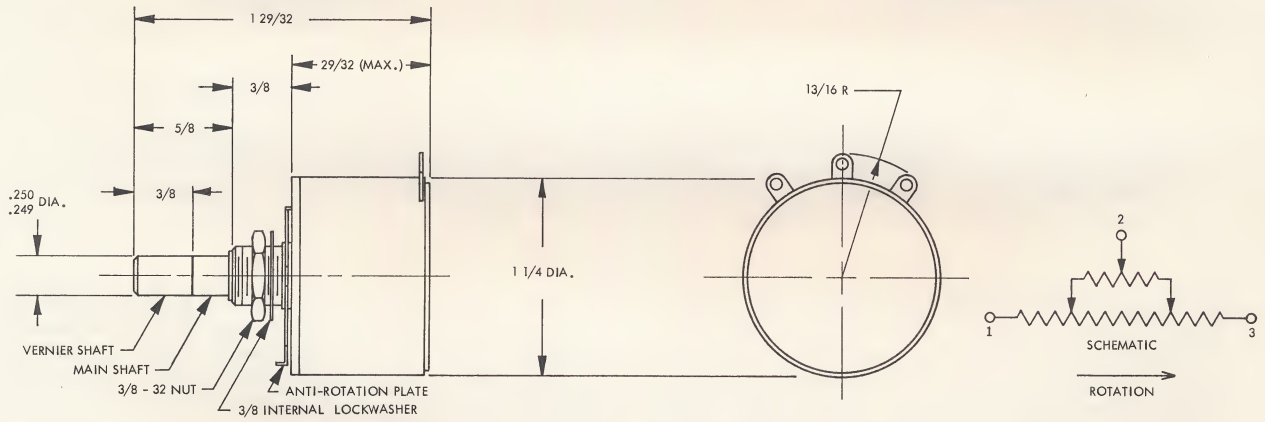
DIELECTRIC STRENGTH (bushing to winding): 1000 VRMS.

INSULATION RESISTANCE (bushing to winding): 10^{11}Ω min.

LOAD LIFE: 1000 hours at 40° C.

PHASE SHIFT: Less than 3° C at 500kHz.

FREQUENCY RESPONSE: DC-500kHz.



MECHANICAL SPECIFICATIONS

MOUNTING: Threaded bushing with 13/32 pilot. Anti-rotation plate for optional use supplied.

MECHANICAL ROTATION:

Total	555°
Main shaft	285°
Vernier shaft	270°

TERMINALS: Three gold-plated lugs.

SHAFT: Diameter 0.250 inch. Length, 5/8". Special shaft configurations available.

TORQUE: Main 3 ± 2 oz/in
Vernier 1 oz/in max.

SHAFT RUNOUT: Maximum TIR/Inch .010 in/in

SHAFT END PLAY: TIR .005".

SHAFT RADIAL PLAY: Maximum .004".

STOP STRENGTH, oz/in: 250.

WEIGHT: 1 oz.

MATERIALS: The main case is of a high quality glass filled diallylphthalate. Vernier cup and insulator are of lexan. This combination provides extremely low leakage and high moisture resistance. The bushing and front mounting plate are one integral anodized aluminum unit preventing damage during installation. Premium resistance alloys are used in all windings. Precious metals selected for wear and compatability are used for all contacts. All metal surfaces are anodized, stainless steel, or plated for wear and resistance to corrosion.

PRICE: $8.50 each.

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Litho in U.S.A.

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